

producing these results, for from no other source in nature is the pressure derived which penetrates in this way into the skeleton.

This is inductive evidence from physiology and comparative anatomy. In place of it Professor Osborn has offered nothing except the following passage:—"The dominating principle in construction of the backbone is maximum strength with minimum weight. The ingenuity of sculpture by which this is brought about, every single vertebra differing from its fellow, baffles the Lamarckian as well as the Darwinian, and tempts us to revive the old teleological explanation"\*. Teleology is not known as an element in science, and explains nothing.

XLVIII.—*Observations on Coleoptera of the Family Buprestidae, with Descriptions of new Species.* By CHAS. O. WATERHOUSE, F.E.S.

[Continued from p. 267.]

*Chryaspis glabra*, sp. n.

Elongate, narrow, shining. Thorax blackish cyaneous, the sides tinted with green. Elytra golden green, very delicately punctured, suffused with coppery posteriorly.

Long. 29–31 mm.

*Hab.* "Dahr el Ghazal (*Colmant*)," "Arrouimi (*Duvivier*)" (*coll. Kerremans*).

This is an elongate narrow insect like *C. elongata*, Ol., but it is less parallel-sided (with a slight tendency to be elliptical) and more convex on the suture of the elytra. The disk of the thorax is nearly black, marked with fine punctures, which are not very close together; the sides are strongly and rather closely punctured. The elytra are bright golden green; the surface is extremely finely punctured and there are numerous slightly larger (but still fine) punctures, forming three double lines, representing the usual costæ, a few being also on the interstices. Prosternum blue. Abdomen greenish golden.

One specimen (♂) has only a trace of coppery colour near the apex of the elytra. In the second specimen (♀) the

\* 'Memoirs American Museum of Natural History,' vol. i. part 5, p. 193, "A Skeleton of *Diplodocus*."

deeper reddish copper occupies the greater part of the elytra when viewed in certain lights.

Capt. Kerremans considered these examples to be *C. propinqua*, Saund., but that is a flatter insect, with coarsely punctured elytra and with a coppery-red abdomen.

*Chrysoaspis aurata*, Fabr.

*Buprestis aurata*, Fabr., Mant. Ins. i. p. 178.

The type of this species is in Hunter's collection in the University of Glasgow, and Prof. J. Graham Kerr has kindly allowed me to examine it.

It is closely allied to the species known in collections as *C. elongata*, Ol. The general form and sculpture are very similar, but it is a slightly broader insect and is quite differently coloured. It is 33 mm. long and 11 mm. broad just below the shoulders. The thorax is obscure golden green, with scarcely a trace of the coppery colour which is present in *elongata*. The punctuation is the same. The elytra are golden green, the yellow tint prevailing; the outer portion of the *apex* is tinted with light coppery. In *elongata* the copper colour does not extend to the margin. The punctuation is throughout distinctly stronger than in *elongata*, the double lines of punctures are consequently more distinct. In some lights a faint coppery tint is seen between these lines. The prosternum and legs are green. The abdomen golden, with light coppery shade as in *elongata*. The type is a male and has the fifth abdominal segment widely and not deeply emarginate. I notice some of the specimens of *elongata* are similar in this respect, others have the emargination deeper and more triangular.

The only specimens of this species I have ever seen are the type and two examples from Sierra Leone in Dr. Heath's collection.

In the Buprestidæ of Wytsman's 'Genera' Capt. Kerremans gives *Chrysodema splendens*, Nonfried, as a synonym of "*Chrysoaspis aurata*, Fab." I do not know on what authority he places *splendens* in the genus *Chrysoaspis*. From description I should not have taken it to belong to that genus; but anyhow it is certainly not *aurata*. The insect labelled "*aurata*?" in his collection is *auricauda*, Saund.

*C. glabra*, above described, has the colour of the elytra distributed in the same manner as in *aurata*; but *glabra* is a more convex, less parallel species, it is more brilliant, and, although of a golden green, it is nevertheless of a deeper colour than *aurata*, in which the yellow prevails.

*Chrysaspis tincta*, sp. n.

Broad, brilliant. Head and thorax dark cyaneous, the sides with a slight tint of green. Elytra bright golden green, with a deeper reddish-golden tint in some lights. Body beneath brilliant coppery red.

Long. 45 mm.

*Hab.* Gaboon, Senegal, Ogowé (*coll. Kerremans*).

This and *C. armata*, Kerr., are the two most brilliant of the broad species of this genus. [*C. armata* is at once known by the remarkable strong angular projection at the sides of the elytra.] The thorax is finely punctured on the disk, strongly or closely punctured at the sides, with a smooth spot at the anterior angles. The elytra are of a light golden green; in some lights a golden shade prevails, but more generally there is a fiery-red shade, which spreads over nearly the whole surface.

This insect was labelled "*C. viridipennis*, Saund.," in Capt. Kerremans' collection. It is important to note this, as otherwise his description of *C. kassaiensis*, Kerr., is unintelligible. *C. kassaiensis* is the true *viridipennis*, which has the elytra dark green, much more strongly sculptured and without red shade.

*Chrysaspis Welwitschii*, Saund.

Capt. Kerremans has redescribed this as *C. marginata*.

*Chrysaspis dubia*, sp. n.

Very broad, depressed, uniform coppery brown. Elytra with the strong angular projection below the shoulder distinctly visible from above. Abdomen coppery golden.

Long. 46, lat. 18 mm.

*Hab.* Congo, Kassai (*Tschoffen*) (*coll. Kerremans*).

This specimen was labelled "*C. aurovittata*, Saund.," in Capt. Kerremans' collection. The true *aurovittata* he has described as *vittigera*. I am somewhat in doubt whether *dubia* is really distinct, but the colour is so totally different that for the present I prefer to consider it so. It agrees with *aurovittata* in the basal lateral angulation of the elytra being distinctly visible from above.

*Chrysaspis Bennetti*, sp. n.

Head and thorax black, the latter slightly tinted with dark green at the margins. Elytra dark bluish green, the disk

shaded with brownish coppery. Prosternum shining bluish green, the abdomen golden coppery. ♂.

Long. 37 mm.

*Hab.* Congo (*Dr. Bennett*).

This is one of the less brilliant species allied to *aurovittata*, Saund. The thorax is nearly black, with a slight shade of green near the margins. The disk has the punctures very distinct, irregular, but generally separated from each other by one or two diameters of a puncture; a central line almost smooth. The sides more closely and more strongly punctured. Elytra rather dark bluish green, the disks having a slight shade of brownish coppery. The punctuation is rather strong. Dorsally there are five equidistant lines of punctures, *i. e.* there are the usual two pairs of lines with another line between them. Then there is a somewhat broad, closely punctured space, and then the usual lateral pair of lines. Although the punctures are rather close together, there is no transverse rugulosity or confusion. The prosternum is bright bluish green, the central part closely and rather finely punctured. The metasternum is somewhat golden. The abdomen golden coppery, the apical segment very gently emarginate.

Specimens from Capt. Kerremans' collection named *cuneata*, Harold, somewhat resemble this, but the punctuation of the elytra is confused and the prosternum is golden. *C. Bennetlii* is, moreover, narrower. The sides of the elytra have the median sinuosity very strong, stronger than in *cuneata*, the margin is greatly thickened, and the angle made just before this sinuosity, although not acute, is much more marked than in *cuneata*.

#### *Chrysaspis Higletti*, sp. n.

Thorax obliquely narrowed in front, subparallel posteriorly, dark cyaneous, nearly black, the extreme basal margin coppery, the incrassate smooth margin dark green, and there is a little green at the anterior and posterior angles. The flattened disk is moderately strongly punctured, the punctures generally slightly separate, but sometimes nearly touching each other, the sides closely and rugosely punctured. Elytra rich bluish green, suffused with reddish coppery for two thirds their length, leaving the scutellar region and the suture green. The punctuation is rather strong, forming regular lines, except the usual sublateral irregularly punctured space. The underside of the thorax, the mesosternum, and the legs are bright green. The prosternum plane, rather

closely and finely punctured. The metasternum and abdomen are golden coppery, with green shades. The apical segment of the abdomen is triangularly emarginate.

Long. 41, lat. 15 mm.

*Hab.* W. Africa, Akropong (*Higlett*).

In its short broad form this most nearly resembles *C. auricauda*, Saund., but it is not quite so short as that is. It differs from that and nearly all the species (except *Bennettii*) in having the punctures on the dorsal region of the elytra arranged in lines. The posterior lateral angulation of the elytra is very strong, almost acute. The space close to the posterior angles of the thorax is finely rugose, but this character may not be constant.

*Steraspis arabica*, sp. n.

Head black, with green and coppery lines in front. Thorax broad, black, obliquely narrowed in front, almost parallel behind the middle, with a deeply impressed median line, moderately closely and strongly punctured on the disk, rugose at the sides, with a rugose coppery impression extending from the anterior angle to the base, where it is much narrower than in front. The punctures coppery. Elytra more parallel than is usual in this genus, black, with obscure coppery punctuation, which gives them a brown appearance. The punctuation is very fine and irregular. The raised shining black intervals make the surface irregularly rugulose, except that near the scutellum there are some longitudinal lines. Prosternum bisulcate. Abdomen shining steel-blue, each segment with a broad, finely punctured, and pubescent coppery fascia on each side, leaving a narrow median smooth line on the second, third, and fourth segments.

This species is allied to *S. speciosa*, having the abdomen banded in somewhat the same way and the thorax with a median impressed line, but the elytra are finely rugulose, without longitudinal lines except in the scutellar region.

Long. 40, lat. 15 mm.

*Hab.* Arabia, Muscat (*Dr. Jayakar*).

[To be continued.]